

WHAT IS CLAIMED IS:

1. A pattern inspection apparatus comprising:
 - imaging optics which forms an optical image of
a pattern formed on a plate to be inspected based on
5 designed pattern data;
 - a detected pattern data generator which detects
the optical image to generate detected pattern data;
 - a reference pattern data generator which generates
first reference pattern data regarding the detected
10 pattern data from the designed pattern data;
 - a first comparator which compares the detected
pattern data with the first reference pattern data to
detect a defect of the pattern formed on the plate;
 - a first memory which, when there are a plurality
15 of repeated pattern areas on the plate, stores pattern
data obtained by detecting an inspection area, which is
one of the plurality of repeated pattern areas, as
second reference pattern data;
 - a second comparator which compares the detected
20 pattern data with the second reference pattern data to
detect the defect of the pattern formed on the plate;
and
 - a computer which reads an arrangement, a number,
a dimension and a repeated pitch of the plurality of
25 repeated pattern areas from the designed pattern data,
and stores the inspection area as a basis of the second
reference pattern data.

2. The pattern inspection apparatus according to claim 1, wherein the computer detects presence of the plurality of repeated pattern areas from layout information contained in the designed pattern data, and
5 reads the arrangement, the number, the dimension and the repeated pitch of the plurality of the repeated pattern areas.

3. The pattern inspection apparatus according to claim 1, wherein the computer defines a fixed pattern
10 range as a cell from description of the designed pattern data, detects start positions and finish positions of a plurality of repeated cells from repeated description of the cell, and reads
an arrangement, a number, a dimension and a repeated
15 pitch of the plurality of repeated cells.

4. The pattern inspection apparatus according to claim 1, wherein the computer saves the designed pattern data as an image, extracts a repeated feature by pattern matching to detect presence of a plurality
20 of repeated subchips in one chip, and reads an arrangement, a number, a dimension and a repeated pitch of the plurality of repeated subchips.

5. The pattern inspection apparatus according to claim 1, wherein comparison is carried out for the same
25 detected pattern area by using both of the first and second comparators.

6. The pattern inspection apparatus according to

claim 1, wherein detected pattern data of a first detected area generated by the detected pattern data generator is sent to the first comparator and the first memory,

5 the first comparator compares the detected pattern data of the first detected area with reference pattern data of the first detected area generated by the reference pattern data generator regarding the detected pattern data,

10 detected pattern data of a second detected area generated by the detected pattern data generator after the detected pattern data of the first detected area is sent to the first and second comparators,

 the first comparator compares the detected pattern
15 data of the second detected area with reference pattern data of the second detected area generated by the reference pattern data generator regarding the detected pattern data, and

 the second comparator compares the detected
20 pattern data of the second detected area with the detected pattern data of the first detected area stored in the first memory.

7. The pattern inspection apparatus according to claim 6, wherein detected pattern data of a third
25 detected area generated by the detected pattern data generator after the detected pattern data of the second detected area is sent to the first and second

comparators,

the first comparator compares the detected pattern data of the third detected area with reference pattern data of the third detected area generated by the
5 reference pattern data generator regarding the detected pattern data, and

the second comparator compares the detected pattern data of the third detected area with the detected pattern data of the first detected area stored
10 in the first memory.

8. The pattern inspection apparatus according to claim 1, wherein the reference pattern data generator has a second memory,

the detected pattern data of the first and second
15 detected areas generated by the detected pattern data generator are sent to the first and second memories,

the first comparator compares the detected pattern data of the first and second detected areas with the reference pattern data of the first and second detected
20 areas generated by the reference pattern data generator, and

the second comparator compares the detected pattern data of the first and second detected areas stored in the first memory with each other.

25 9. A pattern inspection apparatus comprising:

imaging optics which forms an optical image of a pattern formed on a plate to be inspected based on

designed pattern data;

a detected pattern data generator which detects the optical image to generate detected pattern data;

5 a reference pattern data generator which generates first reference pattern data regarding the detected pattern data from the designed pattern data;

a first comparator which compares the detected pattern data with the first reference pattern data to detect a defect of the pattern formed on the plate;

10 a first memory which, when there are a plurality of repeated pattern areas on the plate, stores pattern data obtained by detecting an inspection area, which is one of the plurality of repeated pattern areas, as second reference pattern data;

15 a second comparator which compares the detected pattern data with the second reference pattern data to detect the defect of the pattern formed on the plate; and

20 a computer which reads an arrangement, a number, a dimension and a repeated pitch of the plurality of repeated pattern areas from the detected pattern data within an arbitrary range, and stores the inspection area as a basis of the second reference pattern data.

25 10. The pattern inspection apparatus according to claim 9, wherein the computer fetches and stores the detected pattern data of one stripe at an arbitrary position on the plate, extracts a repeated feature of

the detected pattern data of one stripe to detect
presence of a plurality of repeated subchips in one
chip, and reads an arrangement, a number, a dimension
and a repeated pitch of the plurality of the repeated
5 subchips.

11. The pattern inspection apparatus according to
claim 9, wherein the computer fetches and stores the
detected pattern data of one stripe at an arbitrary
position on the plate, extracts a repeated feature of
10 the detected pattern data of one stripe to detect
formation of a plurality of cells in one chip, and
reads the arrangement, the number, the dimension and
the repeated pitch of the plurality of repeated cells.

12. The pattern inspection apparatus according to
15 claim 9, wherein comparison is carried out for the same
detected pattern area by using both of the first and
second comparators.

13. The pattern inspection apparatus according to
claim 9, wherein detected pattern data of a first
20 detected area generated by the detected pattern data
generator is sent to the first comparator and the first
memory,

the first comparator compares the detected pattern
data of the first detected area with reference pattern
25 data of the first detected area generated by the
reference pattern data generator regarding the detected
pattern data,

detected pattern data of a second detected area generated by the detected pattern data generator after the detected pattern data of the first detected area is sent to the first and second comparators,

5 the first comparator compares the detected pattern data of the second detected area with reference pattern data of the second detected area generated by the reference pattern data generator regarding the detected pattern data, and

10 the second comparator compares the detected pattern data of the second detected area with the detected pattern data of the first detected area stored in the first memory.

14. The pattern inspection apparatus according to
15 claim 13, wherein detected pattern data of a third detected area generated by the detected pattern data generator after the detected pattern data of the second detected area is sent to the first and second comparators,

20 the first comparator compares the detected pattern data of the third detected area with reference pattern data of the third detected area generated by the reference pattern data generator regarding the detected pattern data, and

25 the second comparator compares the detected pattern data of the third detected area with the detected pattern data of the first detected area stored

in the first memory.

15. The pattern inspection apparatus according to claim 11, wherein the reference pattern data generator has a second memory,

5 the detected pattern data of the first and second detected areas generated by the detected pattern data generator are sent to the first and second memories,

 the first comparator compares the detected pattern data of the first and second detected areas with the
10 reference pattern data of the first and second detected areas generated by the reference pattern data generator, and

 the second comparator compares the detected pattern data of the first and second detected areas
15 stored in the first memory with each other.